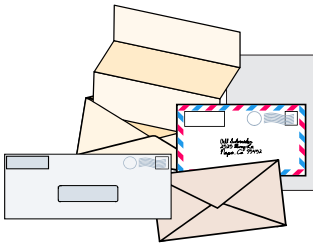

Letters to the Editor

DLC sub-base for concrete roads

This has reference to the paper "Assessment of in-situ strength and quality control aspects of dry lean concrete sub-base for concrete roads" published in the September 2000 issue of *The Indian Concrete Journal* on pp. 530-535. The authors have stressed many times that modern methods have been adopted for production of green concrete, its transportation, and construction of dry lean concrete (DLC) layer.

I would be interested to know about the "modern" methods adopted. This would be useful to other readers also.

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The authors reply:

I thank the reader for soliciting further information on modern methods adopted in production and placement of DLC sub-base for concrete pavement. The detailed response is given below.

Use of batching and mixing plant

For better quality assurance in concrete pavement construction, batching of aggregates and cement should always be by weight. Dispensing solids on a volume basis can lead to gross errors. Batching by weight allows rapid and convenient adjustment of batch weights of aggregates and water when changes in aggregate moisture contents occur. For good control in mix proportions, the maximum allowable tolerances in batching often adopted for major projects are as follows (based on ASTM C94*).

Item	*Individual batching, percent*	*Cumulative batching, percent*
Cement	± 1	± 1
Water	± 1	—
Aggregate	± 2	± 1
Admixture	± 3	—

Available material handling equipment can be categorised as: manual, semi-automatic and fully automatic. Manual batching is acceptable only for small jobs and low output requirements. In medium and large jobs, semi-automatic or fully automatic batching is needed for ensuring quality. In semi-automatic arrangements, the charging and discharging of the batches are activated manually, but are automatically terminated. In a fully automatic system, a single starter switch activates the batching sequence. Both systems require interlocks to maintain tolerances and to prevent the batcher discharging and charging simultaneously. Automatic system, when properly designed, can maintain high-speed batching within specified tolerances. When the functioning of the automatic system is computerised, the whole process starting from the feeding of materials to the loading of green concrete into the transport vehicle is managed using a computer program, which helps in ensuring very good quality of the green concrete produced. Such a system was employed in the present case.

Location of plant

When the batching and mixing plant is located too far from the construction site, certain chemical admixtures may have to be used for maintaining the workability of concrete till it is ready for placement. Also, transportation of concrete in conventional tippers through long distances can lead to segregation of the mix, in which case remixing at site will be needed. This, in turn, will affect the productivity. Hence, if the project permits, ideally the on-site production plant should be as near the construction site as possible. This will obviate the difficulties due to repetitive processes and reduction in quality of the finished product. In the case discussed in the paper, the on-site plant was located within 100 m of the construction site, enabling delivery of good quality concrete at site using tippers and its compaction within 30 minutes of placement. When the plant has to cater to concreting of long stretches, it may be essential to use transit mixers, instead of tippers, for transporting concrete. This is especially essential in tropical climate when the ambient temperatures during the day reach 40 -45°C. In the recently constructed Mumbai-Pune expressway transit mixers were used instead of tippers.

Placement and compaction

DLC delivered at site was deposited in horizontal layers of uniform thickness and each layer was properly compacted before placement of the next layer. The rate of placement was kept rapid enough so that the layer immediately below was still plastic when the new layer was deposited over it. This ensured good quality of construction and obviated the negative consequences of placing fresh concrete on hardened concrete, such as formation of solid joints, flow lines and planes of weakness. Consolidation and compaction of each layer was done by power tampers and vibratory roller. The final levelling and compaction of DLC was effected using screed vibrators.

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*_____*Standard specification for ready-mixed concrete*. ASTM C94. Vol 04.02, Section 4. American Society for Testing and Materials, Philadelphia, P.A. USA 1991.